Refine Search

Your wildcard search against 10000 terms has yielded the results below.

Your result set for the last L# is incomplete.

The probable cause is use of unlimited truncation. Revise your search strategy to use limited truncation.

Search Results -

Terms	Documents
L10 and (switch$ with search$ with (region$ or area$ or local$))	1

Database: US Pre-Grant Publication Full-Text Database
US Patents Full-Text Database
US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L11

Refine Search

Recall Text Clear Interrupt

Search History

DATE: Thursday, September 29, 2005 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
	DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; THES=ASSIGNEE; PLUR=YES; OP=OR		
L11	L10 and (switch$ with search$ with (region$ or area$ or local$))	1	L11
L10	l8 or L9	131	L10
L9	L3 and @ad<=20030110	128	L9
L8	L3 and @pd<=20030110	83	L8
L7	l5 or L6	12	L7
L6	L4 and @pd<=20030110	11	L6
L5	L4 and @ad<=20030110	12	L5
L4	L3 and (divid$ with (area$ or region$))	17	L4
L3	L1 and ((switch$ or chang$) with (area or region$))	177	L3
L2	L1 and 701/208.ccls.	21	L2

L1	NAVIGAT$ AND 701/?.CCLS.	1203	L1

END OF SEARCH HISTORY

L7: Entry 1 of 12 File: PGPB Sep 20, 2001

PGPUB-DOCUMENT-NUMBER: 20010023390
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20010023390 A1

TITLE: Path planning, terrain avoidance and situation awareness system for general aviation

PUBLICATION-DATE: September 20, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Gia, Min-Chung	Taipei		TW	

APPL-NO: 09/ 859407 [PALM]
DATE FILED: May 18, 2001

RELATED-US-APPL-DATA:
Application 09/859407 is a continuation-of US application 09/340025, filed June 28, 1999, PENDING

INT-CL: [07] G01 S 1/16

US-CL-PUBLISHED: 701/301; 701/14, 701/9
US-CL-CURRENT: 701/301; 701/14, 701/9

REPRESENTATIVE-FIGURES: 1

ABSTRACT:

A number of navigation functions are performed on terrain navigation space. A preferred embodiment of dynamic dangerous zone defined by flight altitude is demonstrated. In a preferred embodiment, a set of nodes of terrain height over a minimum flight altitude are located and aggregated. Algorithms such as collision check, mountainous area boundary and region growing technique are developed as basic operations for this terrain model. Yet another preferred embodiment with visibility graph approach for dynamic route selection has been adapted to reduce the real-time computational requirements. This approach [redacted] search space by establishing a partial visibility graph ~~of terrain and avoids details of the~~ terrain, which do not influence the choice of flight path, independent of the size of the navigation space. By exploiting the multiple and variable resolution properties of Oct-tree terrain models, a series of CFIT warning functions using terrain data as reference are implemented efficiently with existence terrain data resource on board.

L7: Entry 1 of 12 File: PGPB Sep 20, 2001

DOCUMENT-IDENTIFIER: US 20010023390 A1

TITLE: Path planning, terrain avoidance and situation awareness system for general aviation

Abstract Paragraph:

A number of navigation functions are performed on terrain navigation space. A preferred embodiment of dynamic dangerous zone defined by flight altitude is demonstrated. In a preferred embodiment, a set of nodes of terrain height over a minimum flight altitude are located and aggregated. Algorithms such as collision check, mountainous area boundary and region growing technique are developed as basic operations for this terrain model. Yet another preferred embodiment with visibility graph approach for dynamic route selection has been adapted to reduce the real-time computational requirements. This approach reduces the size of the search space by establishing a partial visibility graph o[redacted] details of the terrain, which do not influence the choice of flight path, independent of the size of the navigation space. By exploiting the multiple and variable resolution properties of Oct-tree terrain models, a series of CFIT warning functions using terrain data as reference are implemented efficiently with existence terrain data resource on board.

Pre-Grant Publication Date:

20010920

Application Filing Date:

20010518

Current US Classification, US Secondary Class/Subclass:

701/9

Summary of Invention Paragraph:

[0006] "Enhanced" version of GPWS-EGPWS, which is available from AlliedSignal, and Ground Collision Avoidance System (GCAS), which is available from Sextant Avionique, graphically depict terrain surrounding the aircraft's flight path on a cockpit display and provide earlier warning. Both systems are built around a three-dimensional terrain database and implement a true predictive look-ahead capability that is based on aircraft climb performance. The technology has three parts: the advent of GPS and other highly accurate navigation system to provide precise positioning with updates in seconds; computer technology with greater speed and memory; and accurate, sophisticated worldwide terrain databases including a Digital Terrain Elevation Database (DTED) of the world. FIG. 1 shows schematic system diagram of GPWS, which is from DASSAULT ELECTRONIQUE GCAS.

Summary of Invention Paragraph:

[0008] However, terrain database occupies large amounts of memory. If the terrain is mapped at 100-meter intervals over a region 10000 Km by 10000 Km, there are 10.sup.10 grid points. Clearly, the computations inherent in continuously accessing 10.sup.10 grid points are formidable and it is necessary to reduce, or compress this information. Besides, many of navigation functions can be done with knowledge of terrain, such as allowing for optimum flight plan or emergency change of route in real time situation, which could be restrained by the number of data retrieving

and the cost of computation when complexities of algorithms increased. Another major drawback of DTED file is that it only provides elevation data. Without further processing or aids from other formats of terrain data, such as features or vector representations, DTED gives no geometrical relationship among data elements.

Summary of Invention Paragraph:
[0009] There are many applications, particularly in flight management, where the complete DTED database must be accessed to determine or revise the flight waypoints. The terrain awareness warning and navigation safety related issues described here are performed on an encoded terrain navigation space. The encoding of grid file of Digital Terrain Elevation Data (DTED) is based on a variant of quad-tree representation of spatial data structure. Each element of a DTED file are encoded in a Morton numbering sequence with respect to its location in the grid file, a scaled elevation data and coverage of homogeneous (equal elevation) area as features. Under this data structure, a DTED is organized as a set of integer numbers with ascending sequence. Each integer represents a node in which planar location, scaled elevation and coverage are interlaced to a set of bits position to form an integer. The encoded list is defined as terrain Oct-tree model. Navigation functions not only make reference on terrain Oct-tree for elevation data, but also perform processing and operation on it. The navigation space is transferred from DTED array to its encoded integer list.

Summary of Invention Paragraph:
[0010] A number of navigation functions are performed on terrain Oct-tree based navigation space. A preferred embodiment of dynamic dangerous zone defined by flight altitude is demonstrated. In a preferred embodiment, a set of nodes of terrain height over a minimum flight altitude are located and aggregated. Algorithms such as collision check, mountainous area boundary and region growing technique are developed as basic operations for this terrain model. Yet another preferred embodiment with visibility graph approach for dynamic route selection has been adopted to reduce the real-time computational requirements. This approach reduces the size of the search space by establishing a partial visibility graph of terrain and avoids details of the terrain, which do not influence the choice of flight path, independent of the size of the navigation space.

Summary of Invention Paragraph:
[0011] Several forms of CFIT warning functions of aircraft navigation which become feasible once an aircraft flight path and the topology of a region of terrain can be readily determined. Furthermore, it implies access to a database holding the terrain data in order to initiate the geometric computations. By exploiting the multiple and variable resolution properties of Oct-tree terrain models, a series of CFIT warning functions using terrain data as reference are easily implemented. The functions including Ground Proximity Warning, Obstacle Cueing, Terrain Masking, Perspective Images of Terrain, Passive Ranging, Real-time Route Selection and Route Planning, Weather Display Overlaying, and Waypoint Overlaying.

Brief Description of Drawings Paragraph:
[0017] FIGS. 3(a)-3(b) show an example of navigation space with danger nodes.

Detail Description Paragraph:
[0028] In the image processing field, a quad-tree can represent a two dimensional region (in a 2n.times.2n binary array format) by recursively sub-dividing the array into quadrants. If the quadrant consists of a mixture of 1s or 0s, it is further sub-divided into quadrants and this process is repeated 10 until a quadrant consists only of 1s or 0s (termed leaf node). In practice large region of 1s (or 0s) are represented by a single quadrant or node of the tree. Similarly, three-dimensional objects can be represented by Oct-trees where a 2.sup.n.times.2.sup.n.times.2.sup- .n array is sub-divided into octants. If the elements of an octant are common, the Oct-tree terminates; otherwise eight further

sub-octants are generated to represent the octant in more detail.

Detail Description Paragraph:
[0032] 2. Modeling of the Navigation Space

Detail Description Paragraph:
[0033] In general, existing methods of path planning consist of two phases. In the first phase, a search space is generated consisting of all the possible paths that will avoid the obstacles between a start point and a goal point. Once the search space is created, the second phase is to search for a path in which satisfies specific constraints. These approaches are typically based on the assumption that the navigation space (obstacles, terrain, and threat) is static and is fully known a priori.

Detail Description Paragraph:
[0034] Many prior art flight path planning algorithms exploit knowledge of the `cost` of paths in the navigation space to extract an optimal path by minimizing some objective function which defines the `cost` of a path. These algorithms are variants of the `shortest path problem`. A common strategy is the pre-processing of the search space to reduce the real-time computation cost. The pre-processing approaches can be classified in two categories, one which organizes the graph of the search space according to the terrain altitude and the other which embeds pre-computed cost values in a graph of the search space. The flight path planning algorithm described in this invention is based on constraints of flight altitude, flight distance and time to goal. Although the aircraft knows the navigation space, the obstacles vary with operational constraints and are therefore explored in real-time, during the mission.

Detail Description Paragraph:
[0035] The flight path planning algorithm described in the present invention is performed on a terrain Oct-tree representation of the navigation space and without the use of any other data formats to represent terrain features (linear or polygonal features). Since the set of obstacles dynamically change with flight altitude, a static polygonal representation of obstacles is not suitable for real-time dynamic flight path planning. The terrain Oct-tree is organized as a linear list in which each element represents a leaf node of the tree. Each node is represented as a single integer and represents a homogeneous set of elements of the grid file. The use of an Oct-tree simplifies the extraction of obstacles from a terrain database.

Detail Description Paragraph:
[0040] The nodes in a terrain Oct-tree with scaled elevation values above a flight altitude are known as "danger nodes", in the sense that an aircraft cannot safely enter a region of the terrain occupied by these nodes. The danger node list is a sub-set of the quad-tree representing the nodes of the navigation space. However, the list of danger nodes does not give any explicit topographic information (for example, connectivity or boundary conditions) in the navigation space. In FIG. 3, a danger area containing 26 nodes is shown, organized as an ordered list where it is not clear if node 1 or node 26 belong to the same connected region. Moreover, although the danger nodes are `scattered` throughout the navigation space, only a few of the danger nodes will jeopardize a specific flight path. For instance, in FIG. 4, there are five connected danger regions but, for a path to goal 1, the possible obstacles are limited to regions A and C.

Detail Description Paragraph:
[0041] The danger nodes related to the current direction are termed obstacle nodes and are organized as a set of locational codes, which represent the coverage of dangerous zones in the aircraft navigation space. The organizing of obstacles involves the following steps:

Detail Description Paragraph:
[0042] (1) A list of danger nodes is extracted from the terrain Oct-tree according to an elevation threshold value. The terrain is organized as bands or layers with a suitable vertical scale factor K, for example, 20 m bands. Each node of the Oct-tree is examined to see if its K value (embedded in the locational code) exceeds the threshold. Nodes with K value less than the threshold can be ignored. The resultant list contains all the potential danger nodes in the navigation space.

Detail Description Paragraph:
[0044] (3) A connected dangerous zone is grown to locate the vertices of the region as waypoints. A dangerous zone expansion process involves finding the obstacle leaf nodes adjacent to the leaf node being expanded. The major purpose of this expansion process is to obtain a set of waypoints corresponding to the dangerous zone in navigation space; these-waypoints are subsequently used as possible flight path deviations to avoid a collision with the terrain.

Detail Description Paragraph:
[0052] After the expansion process has been applied to all the members of the SEED list, the dangerous zones are obtained along a direct flight path between the start and goal point, which is dependent on the overall direction of the flight path. FIG. 8a-d shows a gaming area with danger nodes and corresponding regions of obstacles along the different direct paths between the start and goals nodes. The actual topography information of the dangerous zones is extracted from the specific terrain Oct-tree and is transformed into a set of waypoints. These waypoints are then used to construct a visibility graph in the navigation space, to determine the optimal path.

Detail Description Paragraph:
[0053] 3.2 Transformation of Navigation Space

Detail Description Paragraph:
[0054] The construction of a visibility graph is based on a set of waypoints obtained during the acquisition stage. This set of waypoints provides the implicit geographic information of the dangerous zones in navigation space. The algorithm consists of considering all pairs of points (W.sub.from, W.sub.to), where W.sub.from and W.sub.to are start, goal, or intermediate waypoints of dangerous zones. To determine whether W.sub.from and W.sub.to are the endpoints of a valid flight path segment, `collisions` are checked against dangerous zones of a straight line W.sub.from and W.sub.to. The nodes between W.sub.from and W.sub.to are connected by a link in the visibility graph if, and only if, no intersection occurs in the segment joining the two points.

Detail Description Paragraph:
[0057] The dangerous zones are obtained by gathering the obstacle nodes along an ideal direct path between the start and goal points and the possible obstacles are limited to those nearby the direct path (or current direction). This approach implies that the irrelevant danger nodes in the navigation space can be ignored and the number of waypoints is accordingly minimized. Because the waypoints only represent the subset of obstacles of the danger areas, this process provides a partial visibility graph of the total navigation space. FIG. 8a-d shows an example of partial configuration and its visibility graph.

Detail Description Paragraph:
[0058] During the collision check, W*(W-1)/2 waypoint pairs where W is the number of waypoints, including the start point S and goal point G. The time complexity for construction of a visibility graph is proportional to W*(W-1)/2. For any navigation space, it can be readily observed that the number of waypoints W is less than the number of vertices n. Moreover, the size of a visibility graph containing W waypoints is smaller than the size of a visibility graph of n vertices. Clearly, significant improvements in the speed of searching can be obtained possible by

reducing the size of a visibility graph.

Detail Description Paragraph:
[0060] The visibility graph is represented in a form of a list of flight path segments as described in the previous section. The path planning problem has been transformed into the discrete problem of searching a visibility graph between a start node and a goal node. For example, FIG. 9 shows a visibility graph representing path segments of a navigation space. There are seven nodes in the graph including the start and goal points. It is reconstructed as a tree structure where the goal node G and other nodes appear more than once in the tree to illustrate its construction.

Detail Description Paragraph:
[0064] As it is anticipated that an aircraft flight path needs to be modified in real-time to match flight conditions and changing obstacles in the environment, the terrain database is accessed for every flight plan change in order to re-form the visibility graph, based on the current obstacle space. This re-planning of a new flight path must be completed within a few seconds for real-time navigation, where this time interval includes the flight path planning computation and also the construction of the path searching space.

Detail Description Paragraph:
[0065] Typically, in a real-time navigation environment, a new flight path is required within few seconds of a request. In practice, extracting waypoints and searching the visibility graph take a relatively small amount of time in comparison with the time taken for the whole path planning process. The strategy of applying the proposed path planning algorithm to the real time dynamic environment is based on observations from applying the algorithm to a specific terrain with randomly generated start and goal points and measuring the time spent on each stage. These measurements include the time to generate the waypoints, the time to construct a visibility graph and the time to find a path at a different resolution level of the terrain Oct-tree. These off-line results of the computation times are subsequently used as references for `tuning` the real time dynamic flight path planning algorithm for a given terrain.

Detail Description Paragraph:
[0066] To vary the resolution of the navigation space, a pyramid of quad-trees is used to represent the navigation space and danger nodes. A layer k of a pyramid is obtained by applying a maximum value function on a 2.times.2 window at layer k+1. However, at upper layers of a pyramid, the path may be obscured as a result of `rounding` the tree nodes and consequently, no path may be found at that layer. In real time applications, it is preferable to avoid the bottleneck cause by establishing a large visibility graph at a detailed resolution layer. On the other hand, it is also important to avoid a coarser resolution layer, which effectively hides the valid path. The determination of the appropriate processing level can be accomplished by first obtaining the waypoints at a pre-defined level, estimating the size of visibility graph and then determining if it is necessary to switch to another layer for path planning.

Detail Description Paragraph:
[0078] Prior art planning approaches use pre-defined obstacle models. However, the dangerous zone obstacle area varies during the execution of a flight plan whenever the flight altitude is changed. Besides, in prior art DTED approach, the number of data retrieving and the cost of computation are in the negative. Optimum flight plan or emergency change of route in real time situation could be restrained by the number of data retrieving and the cost of computation when complexities of algorithms increased in standard DTED based system.

Detail Description Paragraph:
[0080] For a long-range global path planning in airborne environment, either in

pre-planing or in real-time situation, Oct-tree hierarchical decomposition structure avoids excessive detail of terrain in path planning phase. By exploiting the hierarchical nature of Oct-trees terrain model, the path planning algorithm can operate at any layer of the Oct-tree terrain. Moreover, the path planning approach reduces the size of the search space by establishing a partial visibility graph of the navigation space which do not influence the choice of path and avoids details of the terrain. The Oct-tree terrain and visibility graph approach described in present invention has been adapted to meet the real-time computational requirements.

CLAIMS:

1. A method of performing real-time flight path selection and path planing for general aviation, comprising the following steps: using Digitized Terrain Elevation Data (DTED) to generate a terrain model; using this terrain model to provide a navigation space; accessing and retrieving terrain model to generate a terrain map; giving start and goal points on navigation space to determine a ground track of direct flight path on terrain map; identifying dangerous zone based on ground track and flight altitude; using said dangerous zone to allocate a set of way-points for avoidance; constructing a visibility graph of navigation space, in which is a set of collision free path segments; linking start point to goal point by flight path searching algorithm; and obtaining the terrain profile of flight path from terrain model.

6. The method in claim 1, wherein said navigation space is defined as a region for allocating possible flight path; said navigation space combines Oct-trees with quad-trees to provide both 3-D and 2-D operations on terrain elevation data; and the 2-D location code can be obtained by removing the K bits from 3-D locational code.

9. The method in claim 1, wherein due to the geometric region features of said dangerous zone in navigation space, path searching algorithms based on visibility graph are used.

10. A method of performing real-time dynamic collision check comprising the following steps: using Digitized Terrain Elevation Data (DTED) to generate a terrain model; using this terrain model to provide a navigation space; accessing and retrieving terrain model to generate a terrain map; identifying a list of nodes of on navigation space based on flight altitude; giving a ground track of flight path segment which is a list of nodes on terrain map; and determining the flight path segment in conflict with dangerous zone by searching each nodes along the path segment against the list of nodes of dangerous zone.

12. A method of performing real-time dynamic weather condition avoidance comprising: using Digitized Terrain Elevation Data (DTED) to generate a terrain model; using this terrain model to provide a navigation space; accessing and retrieving terrain model to generate a terrain map; giving start and goal points on navigation space to determine a ground track of direct flight path on terrain map; identifying dangerous zone based on ground track and flight altitude; giving a weather condition coverage area which is represented by a list of nodes; adding the list of nodes of the weather coverage area to the list of nodes of the dangerous zone; using new dangerous zone to allocate a set of way-points for avoidance; constructing a visibility graph of new navigation space, in which is a set of collision free path segments; linking start point to goal point by flight path searching algorithm; and obtaining the terrain profile of flight path from terrain model.

14. A method of performing real-time dynamic obstacles avoidance comprising: using Digitized Terrain Elevation Data (DTED) to generate a terrain model; using this terrain model to provide a navigation space; accessing and retrieving terrain model

to generate a terrain map; giving start and goal points on navigation space to determine a ground track of direct flight path on terrain map; identifying dangerous zone based on ground track and flight altitude; giving an obstacles coverage area which is represented by a list of nodes; adding the list of nodes of the obstacles coverage area to the list of nodes of the dangerous zone; using said new dangerous zone to allocate a set of way-points for avoidance; constructing a visibility graph of navigation space, in which is a set of collision free path segments; linking start point to goal point by flight path searching algorithm; and obtaining the terrain profile of flight path from terrain model.

16. A method of performing real-time terrain masking for terrain awareness comprising: using Digitized Terrain Elevation Data (DTED) to generate a terrain model; using this terrain model to provide a navigation space; accessing and retrieving terrain model to generate a terrain map; identifying dangerous zone, peaks, and obstacles coverage area based on ground track of flight path and flight altitude; computing line-of-sight terrain masking; and assigning color code for terrain masking and awareness according to I, J, K, S parameters of highlighting areas.

20. A method of generating perspective images of terrain model, comprising: using Digitized Terrain Elevation Data (DTED) to generate a terrain model; using this terrain model to provide a navigation space; and accessing and retrieving parameters I, J, K, S from terrain model to generate perspective images.

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10/718670

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Search Results - Record(s) 1 through 10 of 12 returned.

☐ 1. Document ID: US 20010023390 A1

Using default format because multiple data bases are involved.

L7: Entry 1 of 12 File: PGPB Sep 20, 2001

Y

PGPUB-DOCUMENT-NUMBER: 20010023390
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20010023390 A1

TITLE: Path planning, terrain avoidance and situation awareness system for general aviation

PUBLICATION-DATE: September 20, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Gia, Min-Chung	Taipei		TW	

US-CL-CURRENT: 701/301; 701/14, 701/9

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. De

☐ 2. Document ID: US 20010003809 A1

L7: Entry 2 of 12 File: PGPB Jun 14, 2001

Y

PGPUB-DOCUMENT-NUMBER: 20010003809
PGPUB-FILING-TYPE: new-utility
DOCUMENT-IDENTIFIER: US 20010003809 A1

TITLE: Image control system controlling traffic of a mobile body, such as an aircraft

PUBLICATION-DATE: June 14, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Hayashi, Keiko	Tokyo		JP	
Shiomi, Kakuichi	Tokyo		JP	

US-CL-CURRENT: 701/120; 340/945, 701/3

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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☐ 3. Document ID: US 6573888 B2
L7: Entry 3 of 12 File: USPT Jun 3, 2003

US-PAT-NO: 6573888
DOCUMENT-IDENTIFIER: US 6573888 B2

TITLE: Image control system controlling traffic of a mobile body, such as an aircraft

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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☐ 4. Document ID: US 6401038 B2
L7: Entry 4 of 12 File: USPT Jun 4, 2002

US-PAT-NO: 6401038
DOCUMENT-IDENTIFIER: US 6401038 B2

TITLE: Path planning, terrain avoidance and situation awareness system for general aviation

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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☐ 5. Document ID: US 6317690 B1
L7: Entry 5 of 12 File: USPT Nov 13, 2001

US-PAT-NO: 6317690
DOCUMENT-IDENTIFIER: US 6317690 B1

TITLE: Path planning, terrain avoidance and situation awareness system for general aviation

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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☐ 6. Document ID: US 6249720 B1
L7: Entry 6 of 12 File: USPT Jun 19, 2001

US-PAT-NO: 6249720
DOCUMENT-IDENTIFIER: US 6249720 B1

TITLE: Device mounted in vehicle

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

☐ 7. Document ID: US 6122572 A

L7: Entry 7 of 12 File: USPT Sep 19, 2000

US-PAT-NO: 6122572
DOCUMENT-IDENTIFIER: US 6122572 A
**** See image for Certificate of Correction ****

TITLE: Autonomous command and control unit for mobile platform

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw De

☐ 8. Document ID: US 5650928 A

L7: Entry 8 of 12 File: USPT Jul 22, 1997

US-PAT-NO: 5650928
DOCUMENT-IDENTIFIER: US 5650928 A

TITLE: Apparatus and method responsive to the on-board measuring of haulage parameters of a vehicle

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw De

☐ 9. Document ID: US 5550742 A

L7: Entry 9 of 12 File: USPT Aug 27, 1996

US-PAT-NO: 5550742
DOCUMENT-IDENTIFIER: US 5550742 A

TITLE: Scheduled motion planning method and apparatus for a vehicle

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw De

☐ 10. Document ID: US 5111400 A

L7: Entry 10 of 12 File: USPT May 5, 1992

US-PAT-NO: 5111400
DOCUMENT-IDENTIFIER: US 5111400 A

TITLE: Automatic integrated real-time flight crew information system

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw De

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Search Results - Record(s) 11 through 12 of 12 returned.

☐ 11. Document ID: US 4924401 A

Using default format because multiple data bases are involved.

L7: Entry 11 of 12 File: USPT May 8, 1990

US-PAT-NO: 4924401
DOCUMENT-IDENTIFIER: US 4924401 A
**** See image for Certificate of Correction ****

TITLE: Aircraft ground collision avoidance and autorecovery systems device

DATE-ISSUED: May 8, 1990

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bice; Gregory W.	Lancaster	CA		
Skoog; Mark A.	Lancaster	CA		
Howard; John D.	Ft. Lauderdale	FL		

US-CL-CURRENT: 701/6; 244/181, 342/29, 342/65, 701/11, 701/300

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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☐ 12. Document ID: US 4224669 A

L7: Entry 12 of 12 File: USPT Sep 23, 1980

Y

US-PAT-NO: 4224669
DOCUMENT-IDENTIFIER: US 4224669 A
**** See image for Certificate of Correction ****

TITLE: Minimum safe altitude monitoring, indication and warning system

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Terms	Documents
L5 or L6	12

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Day : Thursday
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Time: 17:27:09

Content Information for 10/718670

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Attorney Docket # [ ] Search

Bar Code # [ ] Search

Appln Info | **Contents** | Petition Info | Atty/Agent Info | Continuity Data | Foreign Data

Date	Status	Code	Description
09/20/2005		FWDX	DATE FORWARDED TO EXAMINER
~~09/15/2005~~		AMSB	~~AMENDMENT SUBMITTED/ENTERED WITH FILING O~~
09/20/2005		FWDX	DATE FORWARDED TO EXAMINER
~~09/15/2005~~	~~71~~	RCEX	~~REQUEST FOR CONTINUED EXAMINATION (RCE)~~
09/20/2005		ABN9	DISPOSAL FOR A RCE/CPA/129 (EXPRESS ABANDONM
09/15/2005		BRCE	WORKFLOW - REQUEST FOR RCE - BEGIN
06/17/2005	61	MCTFR	MAIL FINAL REJECTION (PTOL - 326)
05/16/2005	60	CTFR	FINAL REJECTION
02/28/2005		RQPR	REQUEST FOR FOREIGN PRIORITY (PRIORITY PAPER
03/08/2005		FWDX	DATE FORWARDED TO EXAMINER
02/28/2005	71	A...	RESPONSE AFTER NON-FINAL ACTION
02/28/2005		XT/G	REQUEST FOR EXTENSION OF TIME - GRANTED
11/22/2004	41	MCTNF	MAIL NON-FINAL REJECTION
11/15/2004	40	CTNF	NON-FINAL REJECTION
10/13/2004		DOCK	CASE DOCKETED TO EXAMINER IN GAU
03/19/2004	30	DOCK	CASE DOCKETED TO EXAMINER IN GAU
03/19/2004		TSSCOMP	IFW TSS PROCESSING BY TECH CENTER COMPLETE
11/24/2003		RQPR	REQUEST FOR FOREIGN PRIORITY (PRIORITY PAPER
11/24/2003		M844	INFORMATION DISCLOSURE STATEMENT (IDS) FILE
02/19/2004	20	WROIPE	APPLICATION RETURN FROM OIPE
02/19/2004	18	ROIPE	APPLICATION RETURN TO OIPE
02/19/2004	20	WROIPE	APPLICATION RETURN FROM OIPE
02/19/2004	18	ROIPE	APPLICATION RETURN TO OIPE
02/18/2004	20	OIPE	APPLICATION DISPATCHED FROM OIPE
02/19/2004		COMP	APPLICATION IS NOW COMPLETE

02/05/2004		L194	CLEARED BY OIPE CSR
02/05/2004		CLSS	CASE CLASSIFIED BY L&R
12/23/2003		SCAN	IFW SCAN & PACR AUTO SECURITY REVIEW
11/24/2003	19	IEXX	INITIAL EXAM TEAM NN

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